

Sustained Dissociated Irregular Tachycardia in Two Pulmonary Veins After Radiofrequency Ablation of Atrial Fibrillation

Andreas Haeberlin, MD, Hildegard Tanner, MD

Department of Cardiology, Bern University Hospital, Inselspital, Bern, Switzerland (A.H., H.T.) ARTORG Cardiovascular Engineering, University of Bern, Bern, Switzerland (A. H.).

Abstract

A 64-year-old woman underwent radiofrequency ablation of atrial fibrillation. After pulmonary vein (PV) isolation, she converted into sinus rhythm. However, irregular PV tachycardia "trapped" in the right and left superior pulmonary vein (RSPV/LSPV) sustained. Fifteen minutes after RSPV isolation, the RSPV tachycardia terminated. However, sustained LSPV tachycardia was still present after one hour. Three months later, a relapse of AF was confirmed and the patient underwent re-ablation. Re-conductance was observed in the RSPV and LSPV.

Introduction

Radiofrequency catheter ablation is an established method for the treatment of atrial fibrillation (AF). After isolation of pulmonary veins (PV's), dissociated electrical activity very often can be observed in the PV's,¹ typically characterized by a regular, short-lasting electric activity with long cycle lengths.^{2,3} Sustained, fast and irregular PV tachycardias are unusual and discussed in this report.

Case Report

A 64-year-old woman was referred for radiofrequency ablation of paroxysmal atrial fibrillation (AF). AF had been diagnosed four years ago, since the patient suffered from intermittent palpitations, dizziness and dyspnea. Initially, amiodarone had successfully restored sinus rhythm. Though, a few months prior to the admission, highly symptomatic episodes of atrial fibrillation occurred again despite amiodarone and metoprolol.

On admission, the patient was in sinus rhythm (SR). After transseptal puncture, the advanced ablation catheter perforated the left atrial wall and AF occurred. Echocardiography showed only a minor pericardial effusion. Thus, we continued the ablation procedure. Circumferential isolation of the right and left PV resulted in conversion into SR after the last PV was isolated. However, irregular PV tachycardia "trapped" in the right and left superior pulmonary vein (RSPV/LSPV) sustained (figure). Fifteen minutes after isolation of the RSPV, the tachycardia at this site terminated.

Disclosures:
None.

Corresponding Author:
Andreas Haeberlin, MD
Murtenstrasse 50
Postfach 44
CH-3010 Bern, SWITZERLAND

Since pericardial effusion became now hemodynamically relevant, a pericardiocentesis was done and 350ml of blood were removed. More than one hour after PV isolation, all veins were still isolated (entry and exit block in the right PV's and the left inferior pulmonary vein). However, sustained LSPV tachycardia with a mean cycle length of 148 ms was still present at the end of ablation (patient in SR, i. e. LSPV exit block). The patient left the hospital three days later.

Three months later, a relapse of paroxysmal AF was confirmed and the patient underwent re-ablation. Re-conductance was observed in the RSPV and LSPV. All veins were successfully re-isolated. This time, no focal activity in the PV's was observed after re-isolation and a waiting period of >45 minutes (LSPV) and 25 minutes (RSPV). Six months after re-ablation, a 7-day ECG again showed a single episode of AF (<30 minutes). However, the patient was oligosymptomatic and refused further invasive treatment.

Discussion

Our findings represent an unusual case of a fast dissociated irregular tachycardia occurring simultaneously in two isolated PV's whilst the patient was in SR. This has not been described before and is of educational value since it exemplifies nicely the key concept of PV isolation, i. e. exit block allowing for different rhythms in the PV's and atria.

In general, dissociated PV activity is common and can be found in 12%-42% of isolated PV's, most commonly in the RSPV and LSPV.¹ However, it is typically characterized by a regular, short-lasting electric activity with cycle lengths of 1000 to >3000 ms and disappearance within seconds to just a few minutes after PV isolation.^{2,3} A fast, sustained and irregular PV tachycardia after PV isolation may be a very rare finding, in particular occurring simultaneously in two PV's. In our patient, the management of left atrial perforation prolonged

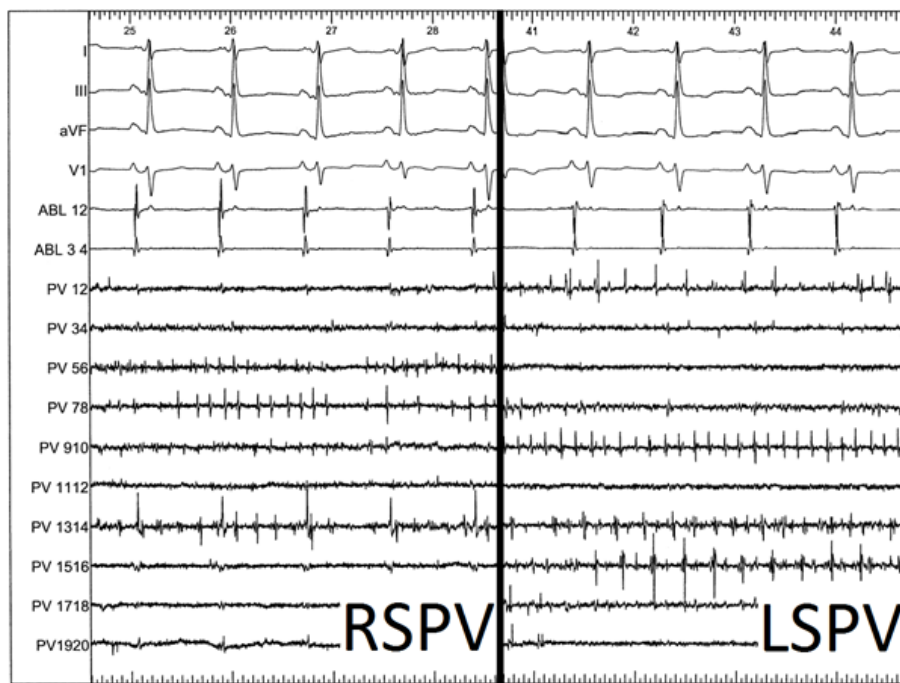


Figure 1:

Isolated LSPV (right panel) and isolated RSPV (left panel), exhibiting PV tachycardia whilst the patient is in sinus rhythm. Leads I, III, aVF and V1 are shown at the top. The lasso catheter (PV12 to PV1920) is positioned at the LSPV/RSPV ostium.

the ablation procedure and caused an ECG monitoring of the LSPV for more than 60 minutes.

Dissociated PV rhythm implies the presence of exit block, an endpoint of successful PV isolation. Though, it has also been shown that dissociated PV rhythm may predict PV reconnection,¹ which was indeed the case in our patient. Thus, it has been suggested to prolong the waiting period after PV isolation to achieve a better long-term outcome or to administer adenosine to evaluate for PV reconnection.⁴ However, the significance of duration, regularity and cycle length of dissociated PV rhythms with respect to PV reconnection is still unclear.

Conclusions:

We present an unusual case of fast sustained dissociated irregular tachycardias occurring simultaneously in two PV's, whilst the patient was in sinus rhythm. Usually, dissociated activity is characterized by short-lasting regular electric activity with long cycle lengths. The significance of the PV tachycardias we observed is unknown, although it may predict PV reconnection.

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